

DOCUMENT RESUME

ED 224 787

SP 021 538

AUTHOR Kneer, Marian E.
TITLE Use of Skill/Activity Tests to Achieve Sex Fair Ability Grouping in Physical Education for Junior and Senior High School.
SPONS AGENCY Illinois State Board of Education, Springfield.
PUB DATE Aug 81
NOTE 19p.; Paper presented at the Physical Education Ability Grouping and Performance Evaluation Symposium (Ottawa, IL, August 13-14, 1981). For related document, see ED 222 490.
PUB TYPE Information Analyses (070) -- Reports - Evaluative/Feasibility (142) -- Speeches/Conference Papers (150)
EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS *Ability Grouping; Ability Identification; Coeducation; *Criterion Referenced Tests; Individualized Instruction; *Norm Referenced Tests; *Performance Tests; *Physical Education; Psychomotor Skills; Secondary Education; *Sex Fairness; Student Evaluation; Student Placement; Teaching Methods; Testing

ABSTRACT

Psychomotor, or physical education skills, can be tested through the use of various measures which employ one or more sport-specific objective measures, such as norm- or criterion-referenced tests, or subjective measures, such as teacher ratings or student self-rating. Norm-referenced tests embody standards which are set relatively for the purpose of discriminating among individuals. Criterion-referenced tests set an absolute standard for a specific domain of tasks. To achieve sex-integrated physical education that provides equal educational opportunity and lessens sex-roles stereotyping, results of criterion-referenced skill tests can be used to assign students to similar skill groups or mastery levels. Instructional approaches will need to be adjusted to accommodate ability differences. If students are assigned to a class composed of students of similar ability, traditional instructional strategies may be successful. Placing students in skill-integrated classes will require a differentiated approach, using either small, similar ability groups or individualized instruction. Differentiated approaches are generally accepted as the best means to provide sex-fair instruction, but they are often not used because of lack of materials or time and because physical education teachers are not well prepared to apply them. (Author/JD)

 * Reproductions supplied by EDRS are the best that can be made *
 * from the original document. *

USE OF SKILL/ACTIVITY TESTS TO ACHIEVE SEX FAIR
ABILITY GROUPING IN PHYSICAL EDUCATION FOR
JUNIOR AND SENIOR HIGH SCHOOL

by Marian E. Kneer

University of Illinois at Chicago Circle

U.S. DEPARTMENT OF EDUCATION
NATIONAL INSTITUTE OF EDUCATION
EDUCATIONAL RESOURCES INFORMATION
CENTER (ERIC)

☒ This document has been reproduced as
received from the person or organization
originating it.

☐ Minor changes have been made to improve
reproduction quality.

• Points of view or opinions stated in this docu-
ment do not necessarily represent official NIE
position or policy.

A paper presented to the Illinois State
Board Of Education
Physical Education Ability Grouping and Performance
Evaluation Symposium
August 13-14, 1981
Ottawa, Illinois

"PERMISSION TO REPRODUCE THIS
MATERIAL HAS BEEN GRANTED BY

C. Reisinger

TO THE EDUCATIONAL RESOURCES
INFORMATION CENTER (ERIC)."

This paper was prepared under contract with the Illinois State Board of Education for presentation at the Physical Education Ability Grouping and Performance Evaluation Symposium, August, 1981. Opinions expressed herein do not necessarily reflect the position or policy of the State Board, and no official endorsement should be inferred.

The reader is referred to: Tips and Techniques: Ability Grouping and Performance Evaluation in Physical Education, Illinois State Board of Education. Springfield, Illinois. 1982.

Use of Skill/Activity Tests to
Achieve Sex Fair Ability Grouping
in Physical Education for
Junior and Senior High School

by Marian E. Kneer
University of Illinois at Chicago Circle

ABSTRACT

Sex fair instruction in physical education is difficult to achieve because of professional ambivalence, situational problems, and student biologic differences. Ability grouping as means to facilitate a wide range of skill difference is professionally endorsed but not widely used or accepted.

The purpose of this paper is to address the process of measurement to classify students by ability to accommodate the wide range of skill ability within any one of many sport and physical activities offered in physical education to achieve sex fair groupings. The application of skill tests is one way to identify ability differences.

Testing skill is possible by using a variety of means to measure skill by employing one or more sport specific objective measures such as norm or criterion referenced tests or subjective measures such as teacher ratings or student self rating. Skill tests should be valid, reliable and objective. Prior to the 1970's many skill tests were constructed and published to meet these standards. Most of the tests were norm-referenced. Norm referenced tests embody standards which are set relatively for the purpose of discriminating among individuals. Criterion referenced tests became a great interest to physical educators since 1970 as a response to the instructional objectives movement and a general dissatisfaction which norm referenced standards. Criterion referenced tests set a absolute standard for a specific domain of tasks.

Given the goals of sex integrated physical education to provide an equal educational opportunity and to lessen sex roles stereotyping, applying criterion referenced skill tests for the purpose of assigning students to similiar skill groups or mastery levels is proposed. The instructional approach will need to be adjusted to accommodate ability differences. If students are assigned to a class composed of students of similiar ability, then the traditional group teaching behavior may be successful. Placing students in skill integrated classes will require a differentiated approach using either small similiar ability groups or individualized instruction.

Differentiated approaches are generally accepted as the best means to provide sex fair instruction. Unfortunately, physical educators are not well prepared to use their approach, the school situation does not provide the needed time to prepare the necessary materials, and teachers are general pessimistic about the success of proposed practiced to achieve sex integrated physical education.

Few disciplines seem to be besieged with the multitude and magnitude of problems as physical education. Debates have raged within the profession for years which reflect philosophic, goal, instructional, curriculum, and evaluation differences. In addition, the practice of the discipline has rarely been carried out under ideal conditions. Classes are traditionally too large, facilities too small, equipment insufficient, and administrative support lacking. Now added to these woes are the problems resulting from mandated sex integrated physical education. It is understandable, that compliance concerns expressed by physical educators, frequently focus on how boys and girls can be taught in the same class. Obviously, these concerns has its genesis in the easily observable ability differences between the sexes.

Title IX clearly allows that ability grouping within and between classes is permitted even if such grouping results is one sex outnumbering the other within the group; and recognizes that, even when grouped, evaluation problems would arise. It is suggested that if a single evaluation standard has an adverse impact on students of one sex, a differentiated standard may be used to alleviate excessive hardship for one sex. (1974) Klappholtz (1975) supports Title IX enthusiastically, stating:

There is nothing to fear in Title IX regulations. In fact there is nothing in them that is contrary to sound principles of physical education....we've felt for a long time that classes should be organized on a coed basis....that ability grouping made for efficient teaching and learning and that by using both male and female instructors, schools could make maximum use of teacher talent. p.1

Yet a study by Geadelman (1978) revealed that there are widespread deficiencies on meeting Title IX regulations and intentions. Mood, (1980) reflecting an observed trend to less educational goals, suggests changing physical education objectives to stress social outcomes as a response to coeducation. Clearly the perceived bright new world of physical education

envisioned as a response to Title IX has not occurred. It has not occurred for two major reasons. First anyone can see that men weigh on the average 30-40 pounds more than women, are 5-6 inches taller and carry about 10% less body fat. Cheffers (1975) states "research does establish differences between male/female performers in physical psychosocial spheres." No research is available on how much difference and whether it is chemistry or culturally defined by sex roles." (p. 33) and secondly, Kelly and Lindsay (1980) have identified that practitioners and graduating seniors in physical education are deficient in their understanding of physical education knowledge deemed important by experts; and noted that, the most deficient area of all, related to evaluation, criterion and norm referenced tests, standardized and performance tests. (p. 641)

Research has been meager relative to outcomes resulting from coeducational physical education. Locke and Nixon (1973) cited "little evidence that results differ in integrated and segregated classes." (p. 1215) Brightwell (1969) found no achievement differences in a sex integrated tennis class. On the other hand, Bunks (1966) found a distinct advantage in skill learning for women.

Sex integrated physical education has been endorsed by all the physical education professional associations including the American Alliance of Health, Physical Education, Recreation and Dance and Illinois Association for Health, Physical Education, and Recreation. The later group issued a position paper in 1976. Several tenets are of interest to this paper:

Evaluation programs utilizing homogeneous grouping should be ability oriented than sex oriented.

The physical educator is capable of assessing achievement and seeking appropriate means of improving performance.

Ability grouping should be based upon non-discriminating criteria specific to the instructional unit, and clearly a part of the instructional process. (p. 9)

Ability differences are a result of innate motor ability, neurologic development, psychological aspects, experience, level of mastery of a specific sport, and student interests and goals. Groupings may be separate classes or groups within a class for specific learning purposes. Grouping in education is defined by Hawkes (1971) as "an organizational procedure by which a group of children is divided on some criterion in order to facilitate the learning process," (p. 167) Leavitt (1971) notes:

With the extreme wide range of ability teachers may have had to contend with, it is no wonder that students at the bottom of the scale feel overchallenged and frustrated and those at the top find repetitive skill drills boring and unfruitful. (p. 404)

She urged assignment by ability so that those with more background and experience are not held back.

Controversy exists concerning the need to ability group. Nixon and Locke (1973) summarized research on the topic and concluded that despite substantive enthusiasm for it that there is little support for ability grouping when measures of physical performance are the standard of judgement. (p. 1210) Nevertheless, Lockhart and Mott (1951) found that high ability students improved when ability grouped.

Assessment of ability for grouping involves measurement and evaluation. Evaluations can be based on measurements, opinions, observations, and previous records. Although assessment is most often used for grades, most agree (Safrit, 1981; Klesius, 1981; Jensen and Hirst, 1980) it can be used for many purposes such as decisions for diagnosis, classes for instruction, motivation, research, program selection, proficiency, achievement level, teaching, and learning. Safrit (1981) comments that the process of assessment has been hampered by lack of standardized measures, testing materials,

and personnel to develop tests. (p. 6)

The purpose of this paper is to address the process of measurement to classify students by ability, as a means to accommodate a wide range of skill within any one of many sport and physical activities offered in physical education to achieve sex fair ability groups within Junior and Senior high school physical education. It is assumed that readers will wish to comply with the Title IX regulation and purposes, that they will evaluate, and accept physical education as an educational endeavor.

Appraisal of Skill Tests

Skill testing in physical education formally began in early 1920. Considerable development of skill tests persisted into the early 1960's when the AAHPERD instituted a national skill test project featuring national norms. Originally about 18 tests were planned. At this time only a few are available. Interest waned in the 1970's when criterion referenced tests began to catch the interest of physical educators through the work of Mosston (1966) and Safrit (1975). Since that time Phillip and Hornak (1979) claim that there has been a trend in physical education away from extensive use of pre-constructed or standardized skill tests because of discrepancies between teacher developed objectives and objectives measured by standardized tests. (p. 157) This trend undoubtedly accounts for the delay in the AAHPERD skill testing project.

The decision to place students in a designated ability group obviously needs some standard to base ability judgements. That standard may be an absolute or actual skill related to a specific sport; or a relative standard of skill attained by students of a certain age or level. These standards can be measured subjectively or objectively; and the measurements may be taken at the onset of instruction to determine the initial placement, and/or

periodically, during the learning stage to maintain appropriate group placement.

Standards of performance have been an issue in physical education and that issue has intensified since Mager (1966) urged instructional objectives which necessitated a standard of performance. Glaser (1963) proposed that the standard be a measure of behavior rather than a measure of comparison. Competency based education intensified interest in identifying standards and certainly Title IX has forced the need for direction on this matter.

Standards that are set relatively are called norm-referenced. Their purpose is to discriminate among individuals. Standards set absolutely are called criterion-referenced. Their purpose is to specify some domain of tasks that the student should perform. Safrit (1980) points out that since norm referenced standards are based relative to the behavior of a specified group, they may not reflect the needed or appropriate level of skill in relationship to the demands of the activity. However, since they do reflect a group capability, they may serve to guide decisions in setting criterion levels. On the other hand, criterion referenced standards may be selected on the basis of (1) scientific evidence, (2) experience, (3) intuition or (4) a combination of the factors reflecting the demands of the skills in the activity. (p. 153) Popham (1976) believes that the overriding distinction between criterion and referenced achievement standards is the quality of the description yielded by the two approaches. He points out that norm referenced standards yield a general idea of the skill and the relative standing with others; whereas, criterion referencing, yields a "precise fix" of what a student can or cannot do. It is this increased descriptive power which is appealing. Popham urges securing comparative data based on criterion referenced standards. (p. 593-94)

Regardless of the issues surrounding standards, what is needed is information about performance to ascertain a sex fair ability group. Information can be secured in a variety of ways using skill tests, rating scales, actual performance and/or subjective observation. Which ever system is selected is often dependent upon the precision demanded or is possible.

Clearly information obtained from measurement instruments that are valid, reliable and objectively administered will usually be the most accurate and dependable. Baumgartner and Jackson (1975) state:

Many skill tests offer an objective, reliable and valid method for evaluating motor-skill, others are a waste of time. Teachers should disregard skill tests which do not meet their evaluative needs or the important criteria of objectivity, reliability or validity and feasibility of mass testing. (p. 224)

Skill tests which simulate conditions related to the activity are the most common means to identify ability (Phillips and Hornak, 1979). They usually possess content validity, provide objective quantitative information and guidance for qualitative judgements. Other advantages are ease in administering, amount of time to administer, and their use as practice experiences. However, many skill tests take too long to prepare and prepared tests are often unrealistic to the true situation.

Skill tests to evaluate learning can be categorized into four groups: Accuracy, wall-volley, total body movement, and propelling for power. Accuracy tests involve throwing at a target. They yield discrete data but often lack variability which interferes with reliability of the test. Increasing the target size and number of trials helps to correct this problem. Little sex related ability differences result if power is not a factor in the propulsion. Wall volley tests are often used for volleyball, tennis, softball, soccer and badminton. They tend to yield reliable information but if the environment is not controlled, validity may be lacking. Again sex related ability differences may be negible if power is not a factor. Total body movement

tests are used for dribbling, and similar types of skills. They are reliable and provide good skill practice. Sex related ability performance differences normally are not an important variable in identification of sex fair ability grouping. Propulsion tests such as passing, kicking, and throwing are generally reliable and valid, and easy to administer. However, power is often a factor in these tests and girls may have a disadvantage.

Game performance measures include actual quantitative results such as archery, bowling, golf scores, track and field results, or ratings of the quality of the performance such as in gymnastics and game play. Such performance measures gleaned from a true, rather than artificial setting allows maximum active learning time (ALT) while the rating is conducted. The problems with game performance ratings center around the amount of time needed to secure accuracy and the huge problems in equalizing competition. These problems mostly relate to securing qualitative ratings of game performance. Quantitative performance measures are impossible to secure for initial ability grouping basis for beginners because the students are not capable of executing the skill.

Rating scales can be teacher or student self ratings or previous records. Teacher ratings can be quite accurate. Mattson (1981) ranked students before testing and obtained a positive correlation coefficient of .85 with test results. Rating scales should identify the correct procedure. Osborne and Gordon (1972) found "raters were more accurate in identifying movements which were performed correctly than incorrectly." (p. 55) It should be pointed out that most valid skill tests depend upon ratings as a criterion standard. Qualitative standards depend on ratings for ability information.

It is possible to use student self ratings as a means to identify ability for grouping. Although such ratings may not offer the objectivity of skill

tests, they allow a more inclusive rating of ability and take little time to administer. Kneer (1976) used a student self-diagnosis with high school girls in a badminton class and observed a high degree of accuracy in the ratings. Another method is to develop a criterion-referenced check list to guide subjective evaluation of performance of student skill specific drills and/or game play.

The AAHPERD skill tests (1966) offered one of the most comprehensive collections of norm referenced skill test batteries. The project was planned to provide valid and reliable skill tests with national norms for the purpose of improving teaching, learning, motivation and grading. Each test battery measures principle skills of the sport. Each test measures a single fundamental skill. Percentile norms are provided for each sex and ages 10-18. Record sheets for classes, squads and individuals are available. Unfortunately, test manuals for archery, basketball, football and softball are currently in publication.

According to Sheehan (1971) there are literally "100's" of acceptable tests which measure hundreds of aptitudes and achievements. Safrit (1981) identifies some guidance in using them for ability grouping:

1. Reliability and validity are not as important for ability grouping as for grades or research.
2. Total reliance on published tests is hazardous because any given test is designed for a specific age range, level of skill and stage of learning.
3. If test norms are used, they are often not updated.
4. Any system of evaluation must be tentative until the physical performance of both the male and female students is examined under varying conditions. (p. 264-72)

Sex Fair Skill Testing

Although motor performance differences exist within the sexes, few will disagree that, on the average, these differences escalate between the sexes. A comparison of norms on most skill tests, the AAHPERD fitness tests norms, and recent research easily verify this belief. For example, Stamm (1979) compared bowling and tennis scores and found a clear difference in favor of males.

The problem is how can skill tests be used to form sex fair ability groups. Stamm (1979) cites three approaches which could be used to establish evaluative standards in PE classes: separate, improvement and mastery learning. Sex fair means more than an equal opportunity but also to be socialized in a manner that will diminish perceived or real unfair sex related stereotypic behavior. Consequently, setting different standards reinforces the notion that differences exist; and yet, if a unisex standard is set, most females will be at a disadvantage. Part of the solution is to fit the standard to the activity. If successful performance of the activity does not involve a biologically derived ability advantage to one sex, a unisex standard can be set. Examples of such activity may be badminton, skiing, dance, and golf. If the difference is not cultural; but biological, separate standards would be needed such as in bowling, basketball, volleyball and weight training. Basing evaluation on improvement has no significance for ability grouping other than a possible sex fair way to grade, if a single performance standard is employed.

Master learning offers much promise as a viable procedure to distinguish ability. The major premise of Title IX is to provide an equal opportunity for both sexes to receive the benefits of an educational program. It would seem therefore, that the use of criterion referenced skill tests which are

directly interpreted in terms of specified performance standards may be preferable to norm reference skill tests which are designed to discriminate among individuals. The most widespread use of criterion referenced tests which is applied equally to both sexes is the American Red Cross Swimming tests. The use of criterion referenced skill tests carry mastery states relative to the skill. Safrit (1977) recommends the use of criterion references tests (CRT) to estimate mastery scores of individuals and to educate individuals to mastery achievement states. It may be more appropriate to abandon the ability group notion, and allow sex integrated physical education classes to pursue mastery or achievement states. Such a practice would involve preclass diagnosis based on criterion referenced standards and to periodically engage in criterion reference testing during the formation stage of learning to permit passage to higher or lower mastery levels. Game play may be arranged by mastery levels; or if the class size or nature of the activity negates such classification, and one sex would have an unfair advantage, mastery levels should be equalized on each team. Two problems plague the application of mastery state grouping for learning. Safrit (1980) identifies one of these problems to be "insufficient evidence....to recommend scientifically valid criterion referenced standards for boys and girls." (p. 161) The other problem is that sufficient time is often not planned to pursue mastery or mastery level improvement.

Application

The use of skill tests to identify ability of students for the purpose of facilitating sex fair instruction through grouping or assessing mastery states will require, in any setting, additional teacher preparation time and may take from class instruction time. The time teachers will need to prepare

measures to test skill can be a one time major input with only minor adjustments necessary to refine the process when repeating the teaching of a selected activity. The instructional time required to administer the tests will vary with the system to be employed. Most education scholars view testing as a teaching technique. It may be desirable to consider whether sufficient time has been allocated in the unit to allow learning to occur.

Safrit (1981) suggests that the type of skill test used to ability group should fit the instructional approach. She suggests that it must be associated with appropriate instructional technologicis to have real meaning in education. If the goal is achievement, norm referenced tests should be used; if mastery states, then criterion referenced tests should be used. (p. 1)

The process employed to accommodate ability will have a bearing on which instructional approach can be used, group or differentiated. If the students are placed in a similar mastery level or ability classes, the group instructional approach may be easily applied. If mixed ability classes are formed and skill testing is used to identify ability for sex fair instruction; then group teaching will not operate effectively, and some form of differentiating instruction will need to be employed. Group teaching is by far the most practical instructional approach. Continued effective use for sex fair teaching will require that student ability be measured and courses developed to assign students to the designated ability level class. This practice will require a school to have a large enough enrollment and facilities to accommodate a variety of skill level courses.

Landers (1978) successfully employs a "stranded" program. Students were tested for ability and placed in strands identified as adapted, basic, advanced, gaming and specialized. Such a plan eliminates the ability designations and moves to goal designations.

It may be easier and more possible to allow classes to be scheduled with mixed ability and to accommodate ability differences by employing a differentiated teaching approach, either small group or individualized. Kneer and Neumann (1977) employed both small group and individualized instruction successfully when teaching swimming and badminton under sub-optimal conditions of large enrollment, small space, insufficient equipment and with low socio-economic level high school students. Neumann stated: "After students understood how to utilize various opportunities for learning, the teacher's role during class was mainly as a facilitator." (p. 86) Anshel and Singer (1980) used modular instruction and strategies as opposed to traditional instruction and no strategies, and found performance and retention to be superior. It is possible to accommodate handicapped students in classes using differentiated techniques.

One of the recent interests of educators has been the high relationship of active learning time (ALT) with learning. Many studies using data-based instruments (Anderson, 1980, Siedentop 1976) have revealed extremely low percent of ALT with time ranging from .36 to .03. Aufderheide et. al. (1981) found that individualized instruction provided significantly more ALT and noted that individualized instruction allows teachers an objective and systematic way to identify students needs, assures progress and maintain systematic records of student performance.

Unfortunately many teachers lack the training to be effective using this approach. Another problem with accommodating sex fair ability differences through the use of individualized instruction is the time needed to develop and construct learning modules (Heitmann and Kneer, 1976) and criterion referenced tasks which can be used as tests. No solution is offered for this problem other than the need for the school system to provide time

for instructors to prepare the necessary materials. Nevertheless, individualizing instruction is an effective way of accommodating the wide range of abilities in a coed class. (Kneer, 197 , Arnold, 1977) Clearly, teaching sex integrated physical education classes will require different approaches and methods.

Summary

Sex fair ability identification is possible using a variety of means to assess skill by employing one or more sport specific objective measures such as skill tests which are either norm or criterion referenced or subjective measures such as teacher ratings or student self ratings. However given the goals of sex integrated physical education, it would seem that applying some form of criterion referenced skill tests for the purpose of assigning students to mastery achievement levels either in skill level separated or skill integrated class holds the best promise for providing sex fair instruction. Cheffers states: "The only barrier to effective coeducational class activity appears to exist in poorly prepared lessons and through stereotyped individuals asserting that, "it will not work." (p. 30)

BIBLIOGRAPHY

- American Alliance for Health, Physical Education, Recreation and Dance.
Skill Test Manual-Softball for Boys. Reston, Va.: AAHPERD, 1966.
- Anderson, W.G. Analysis of Teaching Physical Education, St. Louis: C.V. Mosby Company, 1980.
- Anshel, M. and Singer, R.N. "Effect of Learner Strategies with Modular Versus Traditional Instruction on Motor Skill Learning and Retention." Research Quarterly for Sport and Exercise, Reston, Va.: AAHPERD, 1980.
- Arnold, Don E. "Compliance with Title IX in Secondary School Physical Education" JOPER, 48:1, January 1977.
- Aufderheide, S.K., C.J. Knamler, and T.L. McKenzie "Individualized Teaching Strategies and Learning Time: Implications for Mainstreaming" Physical Educator, 38:1, March 1981, pg. 20-25.
- Barrow, H. and R. McGee Measurement in Physical Education, Philadelphia: Lea and Febiger, 1979.
- Eaumgartner, T. and A. Jackson Measurement for Evaluation in P.E., Boston: Houghton-Mifflin Company, 1975, pg. 367.
- Brightwell, D. "Effect of Coed and Segregated Classes on Achievement" Research Quarterly, 1969, 40 (2), pg. 262.
- Cheffers, J. "Teacher Behavior and Attitudes: Is Change Needed?" Briefings: Title X Moving Toward Change. NAPECW and NCPEAM, 1975.
- Clement, A. and B. Hartman Equity in Physical Education, Newton, Mass: Women's Education Equity Act Program, U.S. Department of HEW, 1980.
- Federal Register, Washington, D.C.: Health, Education and Welfare, June 20, 1974, 39: 120, Part II.
- Feely, M.J. "Ability Grouping" JOPER, 1961, 32 (8), pg. 66-67.
- Glaser, R. "Instructional Technology and the Measurement of Learning Outcomes" American Psychologist, 1963, 18, pg. 519-521.
- Hawkes, T. In Teacher Handbook, "Grouping" Chicago: Scott, Foresman Company, 1971, pg. 167-170.
- Heitmann, H. and M. Kneer Physical Education Instruction Techniques, Englewood Cliffs, N.J.: Prentice-Hall, 1976.
- Hopkins, David "Using Skill Tests to Identify Successful and Unsuccessful Basketball Performers" Research Quarterly, 50:30, 1979, pg. 381-387.

- Jensen, C. and C. Hirst Measurement in Physical Education and Athletics, New York: MacMillan Publishing Company, 1980.
- Jesseph, M.J. "The Effect of Motor Ability Classification in Physical Education on Achievement and of High School Girls Attitudes, (Masters Thesis, University of California: Berkeley) Eugene Ore; Microcard Publication, 1956, No. PE 377.
- Johnson, B.L. and J.K. Nelson, Practical Measurements for Evaluation in Physical Education, 3rd Edition, Minneapolis, Minn., Burgess Publishing Company, 1979.
- Kelley, E.J. and C.A. Lindsay "A Comparison of Knowledge Obsolescence of Graduating Seniors and Practitioners in the Field of Physical Education" Research Quarterly Exercise and Science, 1980, Vol. 51:4, pg. 636-644.
- Klappholz, L. Physical Education Newsletter, Old Say Brook, CT, October, 1975.
- Klesius, S. "Measurement and Evaluation: The Neglected Element in Physical Education for the Handicapped" Physical Educator, March , 1981 38:1, pg. 5-19.
- Kneer, M., R.J. Beck, H. Heitmann, A. Neumann and P. Van Slooten. "Development of a Low Cost High Yield Individualized Instructional Model for Teaching of Physical Education Activities" International Journal of Physical Education, 1977, 11:1, pg. 25-29.
- Kneer, M. and A. Neumann "Influence of Sub-Optimal Conditions Upon The Implementation of Differentiated Instructional Techniques in Physical Education" Physical Educator, May, 1977, 34:2, pg. 83.
- Landen, B. "Title IX Alternatives for Improving Programs and Examples of Successful Programs" Physical Education Newsletters, Old Saybrook, CT: Physical Education Publications, January 1978, #89.
- Leavitt, N. "Curriculum and Method Area - Physical Education" Chapter 4 Teacher Handbook, Chicago: Scott-Foresman, 1971, pg. 404.
- Levin, T. and R. Long Effective Instruction, Alexandria, VA: ASCD, 1981.
- Locke, L and J. Nixon Research on Teaching Physical Education, Second Handbook on Teaching, Chicago: Rand McNally, 1973.
- Mager, R.F. Preparing Instructional Objectives, Belmont, Calif: Fearon Publishers, 1962.
- Mattson, M. Relationship of Selected Perceptual Motor Skills to Racquetball Skill (Unpublished Masters Degree Project, University of Illinois at Chicago Circle,) 1981, pg. 35.
- Mood, D.L. "Physical Education Measurement: Past Practices, Present Developments and Future Challenges" Physical Educator, December, 1980, pg. 202.

- Moore, S.L. "Effect of Homogeneous and Heteogeneous Grouping on Motor Skill Learning of College Women in Archery." (Masters Thesis, University of Oregon - Eugene, Oregon: Microcard Publication) 1966, #PSY 270.
- Phillips, J.L. "Homogenous Grouping and Its Effects Upon Learning in Volleyball (Masters Thesis, University of Illinois) University of Illinois Abstracts of Graduate Thesis in Physical Education, Recreation, and Health, Urbana, Illinois, University of Illinois College of Physical Education, 1961.
- Mosston, Moska Teaching Physical Education , Columbus, Ohio: Merrell Publishing Company, 1966.
- Nixon, J. and L. Locke "Research on Teaching Physical Education" Second Handbook on Research on Teaching, Ron Travers, Edition, 1973, Chicago: Rand McNally, pg. 1210.
- Osborne, M. and M. Gordon "An Investigation of the Accuracy of Ratings of A Gross Motor Skill" Research Quarterly, March, 1972, 43:1, pg. 55.
- Phillips, D.A. and J.E. Hornak Measurement and Evaluation in Physical Education, New York: J. Wiley and Sons, 1979.
- "Position Paper Relative to Coed Physical Education" Illinois Journal of IAHPER, Fall, 1976, pg. 18.
- Popham, W. "Normative Data for Criterion-Referenced Tests?" Kappan, May, 1976, pg. 593-594.
- Posen, M. and Keele, S. "Skill Learning" Second Handbook of Research on Teaching Edition RM Travers, Chicago: Rand McNally, 1973, pg. 803.
- Reams, D. and T. Bleier "Developing Team Teaching for Ability Grouping" JOPER, 1968, 39 (7), 50-54.
- Safrit, M. "Criterion-Referenced Measurement: Applications in Physical Education" Motor Skills: Theory to Practice 1977, 2:1, 21-35.
- Safrit, M. Evaluation in Physical Education, 2nd Edition, Englewood Cliffs, N.J.: Prentice-Hall, 1981.
- Safrit, M., T. Baumgartner, A. Jackson and C. Stamm, Issues in Setting Motor Performance Standards, Quest, 1980, 32(2), 152-162.
- Sheehan, T.J. An Introduction to the Evaluation of Measurement Data in Physical Education, Reading, Mass: Addison-Wesley, 1971.
- Seidentop, D. Developing Teaching Skills in Physical Education, Boston: Houghton-Mifflin Co., 1976.
- Stamm, C. "Evaluation of Coeducational Physical Activity Classes" JOPER, January, 1979, pg. 68-69.
- Wilson, K.S. "The Effects of Ability Grouping Upon Learning Volleyball Skills" (Unpublished Masters Thesis - Northeast Missouri State Teachers College) 1966.